Review of Agricultural Economics—Volume 31, Number 4—Pages 914–930
DOI: 10.1111/j.1467-9353.2009.01473.x

Do Government Economists Value AAEA Conferences?

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This article examines the importance and value of attending the annual summer conference of the Agricultural and Applied Economics Association (AAEA) by U.S. Federal government economists. A choice-based conjoint analysis of government funding of five research-facilitating resources, including travel and nontravel resources, shows that respondents have a clear preference for their government agency funding the travel-related resources over the other resources. Furthermore, using the contingent valuation method, we find that these economists would have been willing to pay $195 to $620 to have attended their last AAEA conference, with the bounds on this range depending on modeling assumptions.

Many researchers would probably agree that participation in academic societies and conferences plays a substantial role in enhancing the research process. Several economic studies have examined the demographics of conference membership (e.g., Frankfurter and Lane; Kilmer; Siegfried), but to the best of the authors' knowledge, few studies have sought to value the benefits to participants of activities sponsored by academic associations. One exception is a study by Broder, Bergstrom, and Kriesel, which used an interval-type discrete choice approach to value the 1990 annual American Agricultural Economics Association conference.

In general, conference attendance is the most expensive activity sponsored by academic associations. However, the benefits in terms of willingness to pay (WTP) to participants of attending conferences are usually unknown. First, while the travel and hotel prices are determined by the market (albeit with conference participants as price-takers), the price of conference registration is not. Second, researchers tend not to personally bear a portion of the cost of attending academic conferences, with departments or research grants picking up some or all of the costs of conference participation. Taking points 1 and 2 together, observed data

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The views expressed are the authors' and do not necessarily represent those of the Economic Research Service or the U.S. Department of Agriculture.

do not provide measures of the WTP of conference travel. Such information could be useful to academic associations in evaluation of the scope of their missions. In addition, such information could provide departments with feedback on the allocation of scarce resources.

This study seeks to estimate the value to participants of attending recent annual conferences of the American Agricultural Economics Association conference (AAEA), which was renamed in 2009 as the Agricultural and Applied Economics Association (AAEA). One technological innovation in the intervening seventeen years between the 1990 AAEA conference and the 2007 AAEA that could arguably have a negative impact on the benefits of conference attendance is the introduction and diffusion of the Internet, which makes conferences papers and presentations widely available without the need to physically attend the conference.

Our conference valuation is conducted via a stated preference exercise based on dichotomous choice (DC) contingent valuation methods (CVM). In addition, using conjoint analysis, this study empirically evaluates the importance to the economist of conference travel as compared to other budget-constrained resources. Our pool of participants is composed of economists at the Economic Research Service (ERS) of the U.S. Department of Agriculture. This group represents the largest block of AAEA membership of any one institution. We begin with a brief background on the extent and reasons for conference participation by our group of researchers.

Conference Attendance and Participation

In early 2007, all ERS staff members were asked to respond to a survey on conference participation that was administered via the agency's intranet. The primary purpose of this survey was to collect descriptive statistics on conference travel. However, we took the opportunity offered by this survey to go beyond the collection of simple statistics and use the survey as a vehicle for economic analysis.

The survey instrument was extensively pretested to minimize the potential for respondent confusion. A total of 186 responses were received, out of a staff of 415. The response rate was about 50%, with the three program divisions having similar rates (over 50%), and higher grades having higher response rates (peaking near 70% for GS-14s).[1] However, note that staff members likely to attend an academic conference—namely, managers, and researchers, number around 220, with almost all of them being economists, and in particular, agricultural economics. Hence, the response rate for those who are actually to be in the position of taking an academic trip is quite high at over 80%.

Of the 186 respondents, 146 respondents (over 75% of respondents) took 334 trips to conferences in the last three years. A total of sixty-six different conferences were attended. About 42% of respondents attended one conference, with 26% attending two conferences, and 32% attending three or more.

The top four conferences (AAEA, American Economic Association, International Agricultural Trade Research Consortium, and the International Association of Agricultural Economists) were responsible for over 50% of the trips—with the AAEA being the most popular conference (over 25% of all trips). The respondents

gave *attending sessions* and *giving papers* as their most common conference activities (with the other less common activities being *moderating session*, *being interviewed* [for jobs], and "*other*").

When asked why conferences were attended, the most important reasons were *understanding trends* (by 28% of respondents) and *intellectual simulation* (by 37% of respondents). Reasons such as *feedback on paper* (12%), *professional stature* (8%), and *networking* (6%) lagged behind. Other reasons listed as being important include *assist in hiring*, *committee work*, *nice location/time of year*, and *stay in touch with friends*, but only 9% of respondents chose among these for their most important reason.

Respondents were also asked to rank different means by which the agency contributes to research productivity and effectiveness. The top ranked reasons are *attending AAEA* (for 32% of respondents) and *good computers* (for 29%). However, a number of other reasons are listed as being at least of some importance, including *attending workshops*, *nice offices*, and *paying journal fees*, but none of these accounted for more than 14% of first-place votes. The least important means are *a well-stocked library* and *printing reports*.

Value of Participating in Conferences

In this section, we utilize the contingent valuation method (CVM) to estimate the relationship between a hypothetical conference travel subsidy rate provided by the agency and the willingness of the respondent to attend the conference. The point of asking this hypothetical question was to empirically establish the value employees place on attending conferences. The higher the share of the costs the employee is willing to pay to be able to attend the conference (or alternatively, the lower the minimum cost share by the agency the employee is willing to accept to induce attendance), the greater the employee's valuation for attending the conference.

Discrete choice CVM question formats (Hanemann, 1984, 1987) are commonly used in stated preference surveys questions due to a variety of desirable properties they have relative to open-ended preference elicitation formats, at the expense of less efficiency than the latter. For example, compared to an open-ended response format, the discrete choice framework simplifies the respondent's task in reacting to a hypothetical cost subsidy scenario, and reduces the scope for strategic bias by the respondent. In addition, for our application, the fact that the agency faces a budget constraint when allocating funds among research-facilitating resources should further reduce the scope for strategic response bias. For example, answering "yes" to the bid offer even if the respondent's true WTP is less than the bid offer is unlikely to be a sound strategy in that artificially inflating the mean estimated WTP for conference travel could lead to the agency devoting less funds to other resources the respondent may desire. Champ, Boyle, and Brown provides an overview of arguments for and against discrete choice formats and potential stated preference biases.

We use the discrete choice CVM format to ask the employee whether or not he or she would have attended the most recent AAEA conference if the agency subsidized something less than 100% of the costs of attending the conference.[2] We allowed for the respondents to display uncertainty or ambivalence by having more response choices than simply "yes" or "no" (e.g., Cooper and Osborn;

Groothuis and Whitehead; MacKenzie; Ready, Navrud, and Dubourg; Svento; Ready, Whitehead, and Blomquist). This uncertainty region in the respondent's utility was first formally incorporated into a binary choice random utility model by Deacon and Shapiro. An overview of CVM models with indifferent responses can be found in Hanemann and Kanninen. In our case, the respondent was allowed to choose from among four possible discrete responses: "YES," "Probably Yes," "Probably No," and "NO," which are coded from 0 to 3, respectively. The percent subsidy was randomly varied across the respondents and chosen from the set {50, 60, 70, 80, 90, 95}.[3] Subsidy rates lower than 50% were not offered as respondents would be unlikely to find such rates to be credible.

A standard econometric treatment for ordered categorical data response is an ordered logit or probit model (Greene). Alternatively, the ordered choice treatment can be analyzed as two DC questions (i.e., "0" or "1" response), by grouping the uncertainty responses with either the "yes" or "no" responses (e.g., Ready, Whitehead, and Blomquist; Svento). In one case, to be conservative in categorizing a positive response to the subsidy offer, only the "yes" is treated as a positive response, and "probably yes" is linked with "probably no" and "no" as a "1," or negative response. In the other DC case—the liberal case—both "yes" and "probably yes" are treated as a positive response. We present benefit estimates based on both the DC and ordered models. The benefit estimates for the former have the potential advantage of being the outcome of simple utility difference model. While the latter may have some potential for improved efficiency, it may be based on debatable notions of how respondents express their own uncertainty. At any rate, with the ordered model, the probabilities of the four choice responses sum to 100% by design, which is a useful feature for graphing the density functions.

In conjunction with the CVM question, a follow-up question was used to separately identify respondents who answered "no" in protest to the question scenario (e.g., "the cost of conference trips should be fully covered by the Agency") from those who answered "no" simply because they could not afford the expense or did not believe the benefits of the trip expenses outweighed the expense. The protestors were excluded from the regression analysis; such a respondent may well have a WTP higher than the offered employee cost contribution, but is unwilling to share that information with us for some reason. With their exclusion, those remaining in the analysis have purely pecuniary reasons for accepting or not accepting the share offer.

Results of the DC Probit Analysis of AAEA Conference Attendance

The regression results for the DC CVM questions using the linear random utility model (Hanemann and Kanninen) are presented in table 1.[4] In both the "conservative" and "liberal" cases, the coefficient on the cost share amount was significant and negative, which is the expected sign (recall that "Yes" = 0 here). Besides the cost share subsidy, the only other significant variable in these two regressions was the GS-level (i.e., job grade on the series up to GS-15) of the respondent in the conservative case. Its sign indicated that the higher the GS-level, the greater the probability of accepting an offered subsidy rate, *ceteris paribus*.[5]

Figure 1 presents the probability of the respondent willing to bear a portion of the cost for travel to AAEA summer conferences, as generated from the DC

Table 1. Dichotomous choice regression results for the willingness to pay (WTP) for attending an AAEA conference

	Conservative Version[a]		Liberal Version[b]		Explanatory Variables	
Variable	**Coef.**	***t*-Stat**	**Coef.**	***t*-Stat**	**Mean**	**Std. Err.**
Constant	5.362	4.140	2.631	2.511	1	0
Cost share	−0.037	−2.900	−0.047	−4.173	74.380	17.040
GS	−0.536	−2.547	−0.111	−0.544	3.926	0.905
Journal	0.292	1.005	−0.338	−1.191	1.556	1.323
ERSpub	0.076	0.553	0.109	0.890	2.160	1.427
Submit	−0.010	−0.039	0.299	1.185	1.926	1.430
Conference	−0.036	−0.314	0.097	0.769	2.877	1.495
LR χ^2 (6)		24.99		22.89		
Log likelihood		−31.62		−37.79		
Efron's R^2		0.337		0.235		

[a] "Probably Yes" Treated as a "No" response.
[b] "Probably Yes" Treated as a "Yes" response.
Note: Sample size = 81.
Variable definitions:

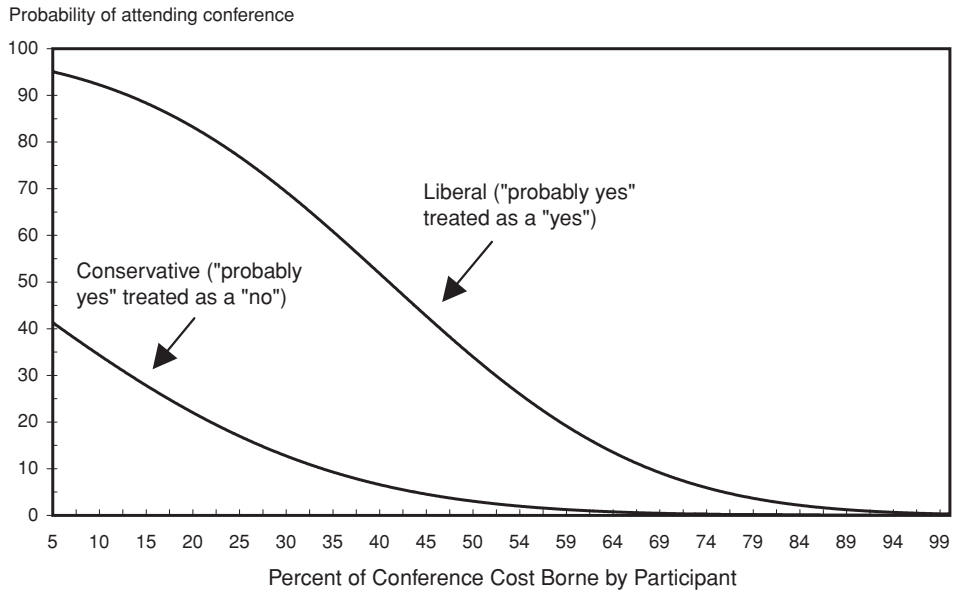
- *Cost share* = the agency's subsidy rate for the conference travel;
- *GS* = grade level of the respondent (GS-9 or below = 0, GS-10 = 1, etc.);
- *Journal* = number of journal articles (either singly or with coauthors) accepted over the previous twenty-four months;
- *ERSpub* = number of ERS publications (either singly or with coauthors) published over the tprevious twenty-four months;
- *Submit* = number of journal articles (either singly or with coauthors) submitted over the previous ttwenty-four months;
- *Conference* = number of conferences attended over the last three years.

regressions. For the conservative case, the percentage of respondents who accept (say "yes") to a 50% cost share is 3%, and the percentage of respondents who accept a 5% cost share is around 40%. For the liberal case, around 95% of respondents will attend an AAEA conference even if they have to bear 5% of the costs. A 33% value for "probably yes" or "yes" to attending an AAEA conference is associated with the respondent bearing 50% of conference costs in this case.

The average cost share the respondent is willing to pay was estimated by evaluating the area under Prob("yes"), that is, 1 minus the cumulative density function (CDF) of the cost share, with respect to the cost share offer. For this calculation, the Prob("yes") was constructed using the "spike" approach (e.g., Haab and McConnell), where Prob("yes") = 1 if the agency's cost share is equal to 100%, Prob("yes") = 0 if the agency's cost share is less than 5%, and Prob("yes") = 1−*CDF*(*cost share*) otherwise.[6]

One question that could be asked about the liberal and conservative responses probabilities in figure 1 is whether or not they are statistically different from each other. To construct this test, we use a "pairs bootstrap" approach. This approach uses a joint resampling methodology that involves drawing *i.i.d.* observations with replacement from the original data set (e.g., Yatchew), in which pair-wise relationships between all the records in the drawn observation are maintained.[7]

Figure 1. Probability of attending the AAEA conference as a function of cost borne by participant (results for dichotomous choice model)



Note: The curve to the right of the 50% subsidy rate is a prediction outside the range of the available data. Other explanatory variables are held at their sample means.

For each of $G = 1{,}000$ data sets generated by this bootstrap, probit coefficients are estimated for both the conservative and liberal models. Next, for each of these G data sets and estimated coefficient vectors, predicted probabilities of attending the AAEA conference under both the conservative and liberal models are calculated for a range of cost share values. This approach allows us to test the equality of predictions under both models, expressed as a null hypothesis of H_0: $\lambda_i = \Pr_L(S_i) - \Pr_C(S_i) = 0$, where $S_i = \{5, 20, 40, 60\}$ cost share offers (expressed in percentage terms), $\Pr(S_i)$ is the probability of attending a conference, and the subscripts L and C denote the liberal and conservative models, respectively. The bootstrap process generates a $(G \times 1)$ vector $\boldsymbol{\lambda}_i$ for each cost share S_i, allowing an empirical confidence interval (Efron) to be generated for each $\boldsymbol{\lambda}_i$.

The results show that the null hypothesis of the equality of the response probabilities for the liberal and conservative models cannot be accepted for any of the S_i based on 95% confidences intervals around λ. For instance, at $S_i = 5\%$, $\bar{\lambda}_i = 0.54$ and the 95% confidence interval around $\bar{\lambda}_i = \{\text{lower bound upper bound}\} = \{0.28, 0.75\}$. At $S_i = 60\%$, $\bar{\lambda}_i = 0.18$ and the 95% confidence interval around $\bar{\lambda}_i = \{0.03, 0.33\}$. Hence, the differences between the two models are due to differences in the use of the response scale and not simply due to differences in error variances between the two models.

Next, we turn to the measure of WTP based on the two DC models. Assuming the conservative standard of only accepting the "Yes" as a positive response, the average cost subsidy that respondents would be willing to pay to attend

AAEA conferences is a 13.0% cost subsidy (standard error is 6.31%).[8,9] If the costs of attending the AAEA conference is $1500, this result means that on average, employees would have attended their last AAEA conference even if they had to pay $195 in out-of-pockets-costs themselves (standard error is $12.25).

However, based on the more liberal standard of also accepting the "Probably Yes" as a positive response, the average cost share that respondents would likely be willing to pay to attend AAEA conferences is 41.2% (standard error is 4.91%).[10,11] If the costs of attending the AAEA conference is $1500, this result means that on average, employees would likely have attended their last AAEA conference even if they had to pay $618 in out-of-pockets-costs themselves (standard error is $30.32). Note that Broder, Bergstrom, and Kriesel, using an interval-style discrete choice approach (one that had each respondent answer yes or no to four different dollar expense rates), estimated a WTP value of $633 in 2007 dollars, and a percentage value of 40.

Using the same bootstrap approach discussed above, one can test Ho: $WTP_L - WTP_C = 0$. The mean value of this statistic is 28%, with a 90% confidence interval of 22% to 37%. Hence, this null hypothesis cannot be accepted.

How does our ratio of the liberal model WTP to conservative model mean WTP vary from other studies? Based on the results above, our ratio is 3.15; Svento found a liberal to conservative ratio of 1.26 for their WTP study, and Groothuis and Whitehead found a ratio of 3.2 for their WTA study. However, previous CVM studies of indifference tend to address hypothetical goods, while in our case, the good itself is real, but having to pay for it is hypothetical. Hence, a comparison of the results of previous studies of uncertainty with this study may be of limited value.

Finally, we measure the change in WTP with respect to GS-level employees in the conservative model, which has the only significant demographic variable. For the GS-12, GS-13, GS-14, and GS-15 employees, the mean WTP in percentage terms is {6%, 9%, 13%, 21%}, respectively, or in dollars terms, the mean WTP is {$90, $135, $195, $315}.

Results of the Ordered Model Analysis of AAEA Conference Attendance

Table 2 presents the results of the ordered probit regression, for both the standard ordered probit model and one that allows variance heterogeneity across the respondents (e.g., Greene; Islam, Luoviere, and Burke). The coefficient on the cost share is significant and of the correct sign in both regressions.[12] Likelihood ratio tests reject the hypothesis that the parameters of the variance function are zero, and we use the heteroskedastic model results for the rest of the analysis. Figure 2a provides the response probabilities for each of the categories "Yes" (will attend), "Probably yes" (probably will attend), "probably No" (probably will not attend), and "No" (will not attend) with respect to AAEA conference travel cost. The results show a 90% probability that respondents are at least generally receptive to paying a 5% share of these costs, and a 61% probability that respondents would be at least generally receptive to paying 40% of the costs. In this latter case, the respondent share would be equivalent to $600 in out-of-pocket costs if we assume total conference costs are $1500.

Table 2. Ordered probit regression results for the WTP to attend an AAEA conference

	Heteroskedastic Model		Homoskedastic Model	
Variable	**Coef.**	***t*-Stat**	**Coef.**	***t*-Stat**
Random Utility Model Parameters (β)				
Intercept	4.133	1.567	4.239	5.848
Cost share	−0.028	−1.730	−.0256	−4.061
GS	−0.360	−1.235	−.3586	−2.560
Journal	0.117	.971	−.022	−0.321
Threshold Parameters for the Random Utility Model (μ)				
μ_1	1.541	1.719	1.540	9.505
μ_2	2.385	1.783	2.404	12.027
Variance Function Parameters (γ)				
GS	0.046	0.309	–	–
Journal	−0.144	−1.682	–	–
Log-likelihood	−88.97		−91.91	
χ^2	28.35		22.46	
Het-test χ^2	5.88(2)			

Notes: The μ_i are threshold values associated with each discrete choice, with μ_o excluded from estimation given inclusion of the intercept.
The heteroskedastic ordered probit model assumes that the variance of the error varies across individuals as $\text{var}[\varepsilon_i] = [\exp(\gamma' Z_i)]^2$, where Z_i is a vector of explanatory variables for individual i (Greene). Given this assumption, in the heteroskedastic ordered probit model, the cumulative density function becomes $F(-\frac{\beta' X_i}{\exp(\gamma' Z_i)})$, rather than $F(-\beta' X_i)$ in the homoscedastic model, in the case of $y = 0$. The cost share variable *GS* is excluded from Z to impose the theoretical requirement that $F(.)$ is monotonic in the cost share. Three additional explanatory variables used in the probit analysis in table 1 were excluded to achieve convergence of the heteroskedastic ordered probit model.

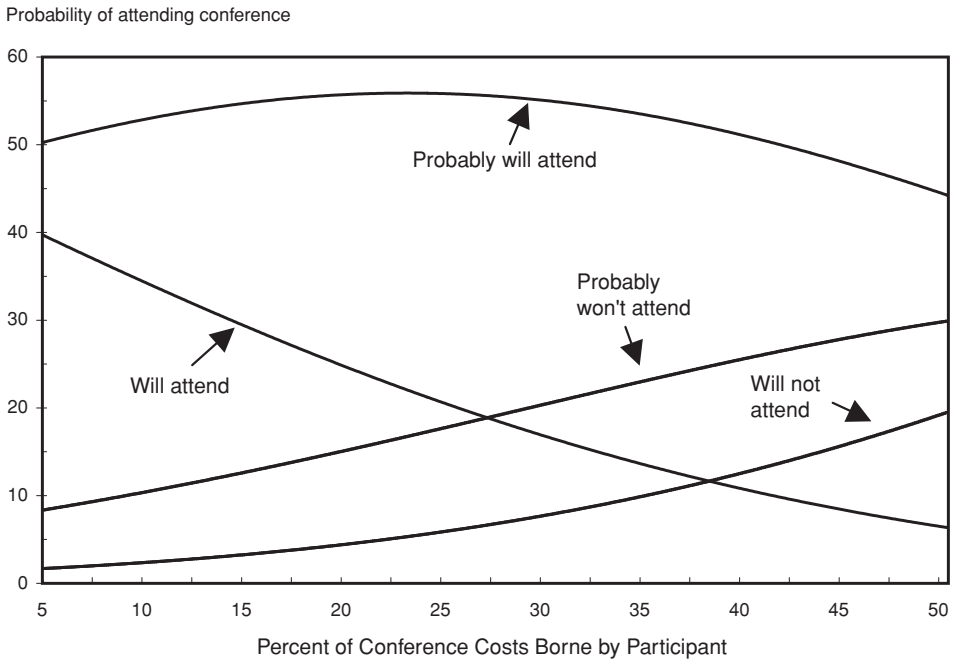
To highlight the shape of uncertain response probability function, figure 2b provides the response probabilities for each of the categories but with the probabilities associated with "probably yes" and "probably no" summed together. The highest level of uncertainty occurs around the 38% cost share. The mean WTP results are little higher than for the DC models. The conservative mean WTP is 15%, and the liberal WTP is 51%, with the former estimated as the area under the *Pr*("will attend") function and the latter under the *Pr*("will attend" or "probably will attend") function.[13]

Conjoint Analysis of Attributes Related to the Research Environment

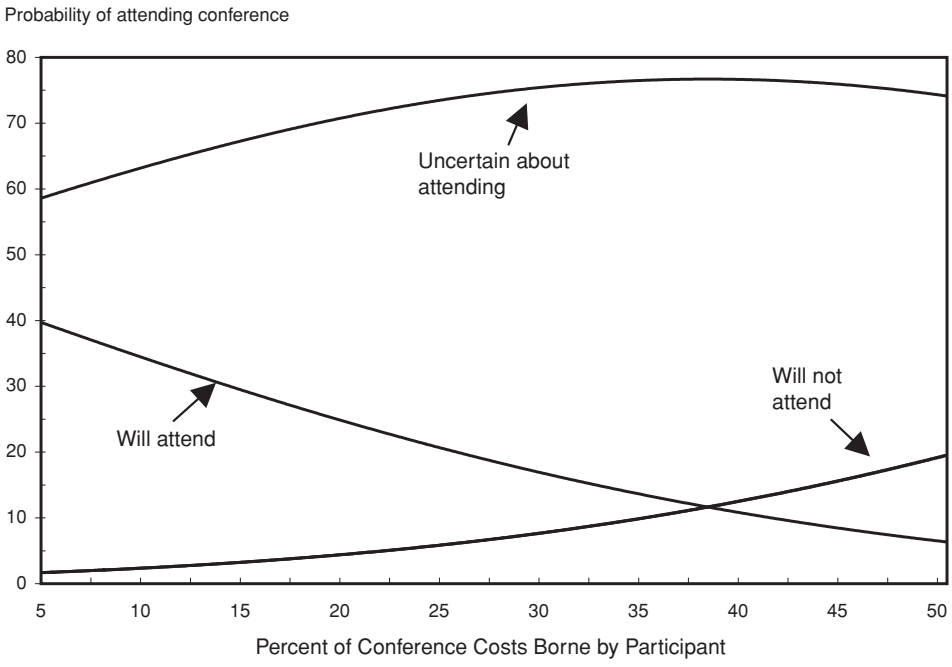
The last section of the conference survey contained questions designed to assess the importance to employees of financial support for AAEA (or equivalent) conference travel versus financial support for four other research-related attributes. These attributes are placed in hypothetical scenarios representing alternative "research tradeoff" environments. Each respondent is asked two separate sets (or

Figure 2. Probability of attending the AAEA conference (ordered model)

a. **All Probabilities Shown Separately**



b. **"Probably yes" and "probably no" combined into "uncertain"**



panels) of conjoint questions, with the second panel of questions having the same general layout as the first set, but with different sets of attribute levels. In each of the two panels, each question asks the respondent to choose between two scenarios (A and B) presented in a box on the survey page, and a scenario of "no change" (described in the survey as a 100% chance of an AAEA or equivalent trip per year, and zero values for the other attributes). In addition, for each panel the respondent is also asked to choose only between scenarios A and B. The appendix provides a facsimile of a panel of the conjoint survey questions.

These questions represent an application of choice-based conjoint (CBC) analysis, which is a stated-preference technique for eliciting valuation of multiattribute commodities. CBC question formats closely mimic the purchase process in real, competitive markets in which consumers consider the attributes of alternative products and choose one. Unlike the discrete choice contingent valuation analysis in the previous section, the CBC measures the contribution of each of a good's attributes to the probability of choosing the good. This approach, which became popular in the early 1990s, is commonly found in behavioral studies and in marketing studies (e.g., Green and Srinivasan, 1978, 1990), and also in nonmarket valuation studies (e.g., Louviere), with the theoretical underpinning dating back to the 1960s and 1970s (Green and Srinivasan, 1978, 1990; Green and Rao; Luce and Tukey).

Table 3 presents the attributes of each conjoint scenario as well as possible attribute levels. To keep the analysis simple and the results robust, we minimize the number of possible values that each attribute can take. A variety of approaches to conjoint sample design are possible (see Street and Burgess), including factorial and random approaches. The attributes were randomly varied across the respondents within some limitations. In particular, no chosen set of attribute vales (S1, P1, T1, R1, and C1) for one scenario were permitted that were strictly inferior to that of the other scenarios (i.e., lower in the level of each attribute). For the three-alternative question, "No change" is defined as a 100% chance that the agency covers one trip to the AAEA (or equivalent) annual conference, and 0 levels for the other four attributes.

Table 3. Attributes of each conjoint scenario and possible attribute levels

Attribute	Possible Attribute Levels
{*S1*} chance of agency paying for an AAEA (or equivalent) annual conference trip.	$S1 = \{0; 60; 90; 100\}\%$
Funds for printing {*P1*} additional ERS reports	$P1 = \{0; 10\}$ reports
{*T1*} additional trips* (other than AAEA or equivalent) per division, handed out according to division needs	$T1 = \{0; 5\}$ trips
{*R1*} percent chance of hiring a research assistant to work for you for 1 year.	$R1 = \{0; 5\}\%$
{*C1*} percent chance of obtaining a $20k cooperative agreement of your choice	$C1 = \{0; 10\}\%$

The analysis of CBC data requires models that explicitly account for variations in attributes. We use discrete choice models; in particular, models based on the multinomial logit (MNL). While MNL models have a number of attractive features (Greene), they also are sensitive to distribution assumptions. Hence, we examine our conjoint responses using five different variants of the MNL.

First, a standard MNL estimator is applied to the three-choice. While well known and easily estimated, a drawback of the standard MNL is the assumption of constant variance across choices (Louveiere et al.). To address this concern, a "parameterized heteroskedastic" model (Islam, Luoviere, and Burke) is estimated. As with the heteroskedastic ordered probit presented earlier, the heteroskedastic model incorporates a "scale" term that accounts for possible variation in the variance of each alternatives random component. In particular, the MNL's $\exp(X * b)$ is replaced with $\exp(e^{XH*bH} * (X * b))$, where the e^{XH*bH} term estimates an observation/alternative-specific scale factor.[14] Since alternatives are arbitrarily specified, it is unlikely that alternative-specific attributes will be correlated with the alternative-specific random component (to the extent they may be, a mixed logit model may be more appropriate). Hence, individual-specific variables are used to model the scale factor.

We also estimate several variants of a Mixed Logit model (Train), which are estimated. The Mixed Logit model extends the MNL by allowing for variable parameters, that is, it allows for random taste variation across respondents. In addition to greater flexibility, the use of the Mixed Logit avoids possible problems with correlations between choices (that is, it relaxes the assumption of the independence of irrelevant alternatives), and allows for correlation in unobserved factors over time. We estimate three variants of the mixed logit. The first of these is a standard MIXED model, which assumes that each of the two questions is independent. We also exploit the panel nature of the data by estimating two "panel" mixed logits, which impose constancy in parameters across questions answered by the same respondent (Revelt and Train). The first of these uses the choice between the two scenarios, with a panel consisting of both of the scenario pairs. The second of these extends the first by adding two "3 alternative" questions composed by allowing a choice between the two scenarios and "no change."[15]

The regression results are presented in table 4. The coefficients on *S1* (the chance of an AAEA or equivalent trip) are always significant, except for the heteroskedastic MNL, for which no coefficients are significant. *T1* (the number of additional trips) is significant at the 10% level or better in four of the regressions, as is P1 (chance of getting data) in three of the regressions. These coefficients both have the expected positive sign, which means that an increase in the level of the attribute in one scenario relative to the other scenarios increases the probability of the respondent choosing that scenario. Although the heteroskedastic MNL is a weaker fit in general, similar patterns are shown in the sign and relative significance of the data. Since the coefficients on the heteroskedasticity terms (GS, Journal Publications, and Government publications) are insignificant, this specification may suffer from multicollinearity.

While the coefficients of most variables are of the expected sign, the coefficient on increasing the chance of hiring a research assistant (*C1*) is negative (but insignificant). One explanation is that unlike students (and in particular, graduate students) in a university setting, student interns at ERS play only a small part

Table 4. Conditional logistic regressions for conjoint questions for the decision between *Scenarios a*, *b*, and *no change*

Attribute	MNL (3 Alternatives)	MNL Heteroskedastic (3 Alternatives)	Mixed Logit (3 Alternatives)	Panel Mixed Logit (3 Alternatives)	Panel Mixed Logit (2 & 3 Alternatives)
Chance AAEA (S1)	0.01559 (5.3)	0.00759 (1.4)	0.01842 (3.2)	0.0293 (4.5)	0.03699 (6.4)
Chance coop (C1)	0.00770 (0.4)	0.00752 (0.8)	0.00832 (0.4)	0.01145 (0.5)	0.02223 (1.7)
Chance data (P1)	0.02377 (1.4)	0.0116 (0.9)	0.02695 (1.5)	0.03499 (1.9)	0.03471 (3.2)
Chance other trip (T1)	0.05635 (1.6)	0.0322 (1.3)	0.06244 (1.7)	0.1021 (2.6)	0.1548 (6.3)
Chance intern (R1)	−0.03669 (−1.0)	−0.0276 (−0.9)	−0.03462 (−0.9)	−0.02712 (−0.63)	−0.03094 (−1.2)
Alternative 2 dummy	0.3880 (2.4)	0.193 (1.2)	0.4086 (2.3)	0.4190 (2.3)	0.2276 (2.1)
Heteroskedasticity terms	n.a.		n.a.	n.a.	n.a.
GS (pay level)		0.874 (0.5)			
Journal publications		0.196 (1.2)			
Government publications		0.0446 (0.40			
Mixed Logit: σ_β					
Chance AAEA	n.a.	n.a.	0.0108 (1.0)	0.0303 (3.7)	0.043 (6.9)
Number of observations (choice occasions per observation)	282 (1)	282 (1)	282 (1)	141 (2)	141 (4)
Log-likelihood	−287.34	−283.03	−286.98	−281.76	−411.46
LR χ^2(6, 7, or 9 *d.f.*)	36.9	131	−26.2	33.6	106.0

Notes:

- *T*-statistics in parenthesis.
- There are 141 respondents with valid answers. Each respondent answered two separate conjoint questions. Each of these two questions had two specified alternatives, plus a "no change" alternative.
- In the no change alternative, ChanceAAEA was 100%, and all other attributes were 0%.
- In the MNL and Mixed Logit, each question is treated as it were answered by a separate respondent.
- In the Panel Mixed logit model, there is more than one "choice occasion" per observation. Each respondent is treated as a single "panel," with each question answered treated as a separate choice occasion. This means that each respondent's coefficient vector is held constant across all questions.
- In the "2 & 3 alternatives" model, the respondent provides two answers to each question" (1) a choice between three alternatives ("no change" is a permissible choice), (2) a choice between two alternatives ("no change" is not a permissible choice).
- All the likelihood ratio tests are significant at well below the 1% level.

Table 5. Trip-related elasticities for fixed-effects logistic regression for conjoint questions decision between *Scenarios A* and *B*

Attribute	MNL (3 Alternatives)	MNL Heteroskedastic (3 Alternatives)	Mixed Logit (3 Alternatives)	Panel Mixed Logit (3 Alternatives)	Panel Mixed Logit (2 & 3 Alternatives)
Chance AAEA (S1)	0.70	0.71	0.83	1.31	1.66
Chance other trip (T1)	0.15	0.17	0.165	0.25	0.39

in supporting research. Instead, these students are hired primarily to provide them with job experience. Hence, working with these interns may be seen by ERS researchers as being a duty rather than a benefit.

Comparing the mixed logit coefficients to the standard MNL results, the former's coefficient values tend to be larger in absolute value, but are relatively similar in sign, significance, and in relation to each other. Similarly, the panel mixed logits yield larger and more significant values than the nonpanel mixed logit, but are qualitatively similar. In all three mixed logit regressions, the random parameter (the variance component) on the AAEA funding variable is about equal to the mean parameter (the systematic component). This suggests that some fraction of respondents have low values for the AAEA conference trips, while others have large values.

Coefficients from a choice-based model are somewhat tricky to interpret. One way to interpret these is to convert them to elasticities, defined as the partial derivative of the probability with respect to an attribute (i.e., the "marginal effect," Greene) times the ratio of the reference attribute level to the reference probability level, where the reference is defined as the variable means. As shown in table 5, given reference values of 90% for *S1* and five trips for *T1* for both Scenarios A and B (and the levels of other attributes set to 0), depending on which estimator is used, the elasticity with respect to *S1* ranges from 0.70 to 1.66, while the elasticity with respect to *T1* ranges between .15 and 0.39. Hence, the respondent's probability of selecting a scenario is more sensitive to increasing the respondent's chance of an AAEA trip (*S1*) than to additional trips handed out to the division (*T1*). Note that although the heteroskedastic MNL regression is statistically different from the standard MNL based on a likelihood ratio test, the elasticities produced by the two models differ little from each other.

In summary, all the logit models suggest that of the five research-facilitating attributes, respondents have a clear preference for directly increasing their own chance of getting the agency to pay for their conference trip, but also appear to have a relatively strong preference for the number of trips available to their division (an administrative unit) or buying data.

Implications and Conclusions

Based on the responses to a staff survey, this article examines the value ERS economists place on attending the AAEA annual conference. The results of the economic analysis suggest a consistent overall conclusion, namely, that ERS

economists find conference travel—and in particular, AAEA conference travel—to be an important job-related activity.

With regard to the summary statistics, with over 75% of ERS economists attending at least one academic conference between 2004 and 2006, conference travel clearly represents a significant allocation of their time. Over 50% of these economists attended an AAEA conference, a rate over three times higher than for the next most frequented conference (the American Economic Association).

Given budget limitations, agency funding of staff trips to AAEA conferences means tradeoffs in what other job-related resources can get funded.[16] In the stated preference portion of the survey, we found that ERS economists had a statistically significant preference for maintaining access to conference travel relative to other job-related resources. In particular, in our CBC analysis of agency funding of five research-facilitating resources—AAEA conference travel, additional conference travel, funds for printing additional reports, and increased chance of obtaining interns or cooperative agreements—respondents have a clear preference for agency funding of the two travel-related resources over the three nontravel resources.

Furthermore, based on our analysis of the discrete choice contingent valuation questions in the survey, it is clear that ERS economists are not simply attending AAEA conferences due to the full coverage by the agency of conference travel costs. If the costs of attending an AAEA conference are $1500, the results of the contingent analysis result predict that, on average, employees would have attended their last AAEA conference even if they had to pay $195 to $618 in out-of-pockets-costs themselves. Given the anecdotal evidence that this group of agricultural economists tends to be relatively parsimonious, even the low end of this range—which is based on conservative modeling assumptions—appears to represent a significant valuation of the benefits of AAEA conference travel to ERS economists.

Broder, Bergstrom, and Kriesel estimated the WTP to attend the 1990 AAEA conference at $633, measured in 2007 dollars, a value within a few dollars of our upper bound estimate. In 1990, the dissemination of conference papers to researchers not attending a conference was slow. Now, the Internet makes conference papers instantly available to all. This stability in WTP with respect to diffusion of the Internet suggests that personal interaction is the driving motivator for attending the AAEA conference.

This analysis addressed the importance of conference travel to ERS economists. Future research could focus on the relationship at the staff member level between productivity (measured in publications, for instance) of ERS economists and conference travel. Making the final linkage between ERS staff productivity and Agency-level impacts would represent a considerably tougher research goal given the difficulty of tying Agency-level impacts to employee-level activities. Such an analysis would likely require time series data, but would likely only be meaningful if conference attendance rates have shown significant variation over time.

No one institution besides ERS likely has a sample size (excluding students) of economists large enough to permit estimation of the WTP of its economists for AAEA conference travel. Hence, to estimate the WTP for a broader group of economists would likely require the AAEA to conduct or sponsor the necessary survey. The survey approach and analysis laid out here could be applied with little modification to a wider group of economists.

Appendix: Facsimile of the Conjoint Questions

To help further our understanding of the importance of travel as compared to other resources, please consider the following *hypothetical* scenarios.

> This is an opportunity to let managers know how you value these tradeoffs.
>
> *Reminder:* Current agency policy is to subsidize the costs of attending the AAEA meetings, or to use this level of expenditure to attend some other meeting. That is, currently there is a 100% chance that the agency covers one trip to the AAEA (or equivalent) annual conference.

Scenario A	Scenario B
• S1a chance of agency paying for an AAEA (or equivalent) annual conference trip.	• S2a chance of agency paying for an AAEA (or equivalent) annual conference trip.
• P1a chance that agency invests $10,000 for commercial data in your research area.	• P2a chance that agency invests $10,000 for commercial data in your research area
• T1a additional trips* (other than AAEA or equivalent) per division, handed out according to division needs	• T2a additional trips* (other than AAEA or equivalent) per division, handed out according to division needs
• R1a percent chance of hiring an intern to work for 1 year.	• R2a percent chance of hiring an intern to work for you for 1 year.
• C1a percent chance of obtaining a $20k cooperative agreement of your choice	• C2a percent chance of obtaining a $20k cooperative agreement of your choice

*"Additional trips" will be for trips in addition to an AAEA (or equivalent) annual conference trip. In other words, some people would receive agency funding for both the AAEA and another conference. Please note that other trips, such as conference trips covered by your branch or official meetings mandated by your job duties, are the same across both scenarios.

Question 3C. If you could choose between scenarios A and B, or no change; which would you choose:

– Scenario A
– Scenario B
– No change*

*No_change: Guaranteed (100% chance) AAEA or equivalent trip per year, no additional funds for commercial data, no additional trips, no additional summer interns, and no additional cooperative agreements

Question 2C. If you had to choose between scenarios A and B, which scenario would you choose:

– Scenario A
– Scenario B

Acknowledgments

The authors would like to thank the two anonymous reviewers, and Marca Weinberg and Greg Pompelli of ERS for their helpful comments.

Endnotes

[1]The "GS" stands for "General Service," which is a pay grade classification system running from grades 1 to 15.

[2]Note that the same random utility model (RUM) framework can be used as the basis for describing both the dichotomous choice CVM and the conjoint analysis decision process and estimation procedures, see, for example, Train, chapter 2, http://elsa.berkeley.edu/books/choice2.html, for the discussion of the RUM.

[3]The specific text of the CVM question is "Would you have attended this conference if the agency subsidized [$\boldsymbol{X}$] percentage of the cost of attending this conference?

$$\_ \text{YES} \_ \text{Probably Yes} \_ \text{Probably No} \_ \text{NO .''}$$

[4]While the results for a standard probit model are presented in table 1, we also estimated a probit model that allows for variance heterogeneity across respondents (Greene), but do not include the results in the table (a footnote in table 2 discusses the formulation of this model). First, achieving convergence was sensitive to the choice of included variables. Second, all the terms in the covariance matrix of the heteroskedastic probit exploded in size, perhaps suggesting excessive collinearity in this model. With only two possible responses ("yes" or "no"), there would appear to be relatively little scope for heterogeneity across respondents to be revealed compared to models with more choices. Furthermore, a likelihood ratio test of the standard model versus the heteroskedastic model could not reject the null hypothesis that the variance function parameters $\boldsymbol{\gamma}$ are equal to zero, with a likelihood ratio test value of 2.49 for the conservative model (critical value of $F_{0.99}(81,2)$ is 4.87), although the hypothesis is barely rejected for the liberal model with a test statistic of 5.22. Finally, the mean WTP for the conservative (liberal) model differs less than 1 (4)% between the heteroskedastic and standard version of the probit.

[5]Additional CVM regressions were conducted using the responses to the Likert style questions from the first part of the survey, but none of their coefficients were significant in these regressions. This result did not surprise the authors as, in their experience, opinion variables are rarely significant in the regression for the CVM question.

[6]Due to Jensen's Inequality, the WTP was estimated separately for each respondent and these averaged, rather than estimating the mean WTP at the point estimates of the explanatory variables.

[7]Swait and Louviere demonstrate a parametric test for the equality of two sets of discrete choice coefficients. However, this approach may not be the best for our needs for two reasons: (1) the two dependent variables are correlated by construction; and (2), in the end, we are not interested in testing whether or not the coefficients are equal across the two models, but whether or not the nonlinear transformations $Pr(S_i)$ are different. Note that since we are examining equality of the predictions, $Pr(S_i)$, and not the taste parameters of the utility function themselves, we do not have to identify the scale parameter; Swait (page 258) notes that predictions (i.e., probabilities) drawn from an MNL model are unaffected by the scale value being unknown.

[8]Standard errors for the WTP values are obtained using paired-bootstrap techniques (e.g., Efron).

[9]The 90% empirical confidence interval for the cost share percentage is 7.67 to 17.40.

[10]The 90% empirical confidence interval for the cost share percentage is 34.61 to 50.39.

[11]Including the fourteen protest bidders in the dataset lowers the liberal model WTP from 41% to 37%, and lowers the liberal model WTP from 14% to 13%.

[12]As with the heteroskedastic probit model, convergence of the heteroskedastic ordered probit model was dependent on the exclusion of several variables that appeared in the analysis in table 1. For the sake of comparability, we left the same variables out of the standard ordered probit regression.

[13]With the standard ordered probit, the mean conservative WTP is the same, while the mean liberal WTP is 52 rather than 51%.

[14]The scale is inversely related to the variance of the alternative-specific random component.

[15]The computer programs for the mixed logit models, which are written in GAUSS, are available from the authors.

[16]Conference travel by federal employees has been of policy interest. For example, under the 2008 Farm Act (PL 110–246), the USDA must report to Congress details of conferences costing the government more than $10,000. In another example, a 2008 act relating to NASA (PL 110–422) limits spending on conference travel by NASA to no more than $5 million per year.

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